REMARKS/ARGUMENTS:

Claim 38 is canceled without prejudice. Claims 13, 15, 18-20, 28, 29, 34, and 37 are amended. Claims 13-15, 18-20, 23-37, 39, and 40 are pending in the application. Reexamination and reconsideration of the application, as amended, are respectfully requested.

The invention relates to a dry etching apparatus, a dry etching method, and a cleaning method adopted in the dry etching apparatus, and more particularly to a dry etching apparatus, a dry etching method, and a cleaning method adopted in the dry etching apparatus suitable for use in texturing the surface of a silicon substrate used in a solar cell or the like. (Applicant's specification, at p. 1, lines 9-14).

CLAIM OBJECTIONS:

Claims 15 and 37 stand objected to because according to the Office it would be preferable to explicitly recite "between the substrate and plate" in connection with the recited distance. In response, the Applicant amended claims 15 and 37 in the manner suggested by the Office. Withdrawal of this objection is thus respectfully requested.

CLAIM REJECTIONS UNDER 35 U.S.C. § 102:

Claims 13, 14, 18, 19, 23-27, 30, 32-36, 38, and 39 stand rejected under 35 U.S.C. 102(b) as being anticipated by Terakado et al. (U.S. Patent No. 5,254,215). This rejection is moot with respect to claim 38 due to the cancellation of this claim. The Applicant respectfully traverses this rejection as to claims 13, 14, 18, 19, 23-27, 30, 32-37, and 39. Claim 13, as amended, is as follows:

A dry etching method comprising:

placing a substrate to be etched on an RF electrode provided inside a chamber, directly or through a tray;

covering said substrate to be etched with a plate ; and

forming fine fixtures on a surface of said substrate to be etched by a reactive ion etching method;

wherein said plate comprises an obstacle with a plurality of obstacle forming members that inhibit a part of gas and plasma from passing through said plate.

Claim 13, as amended, recites "forming fine textures on a surface of said substrate to be etched by a reactive ion etching method".

Terakado discloses a dry etching method using an excitation light. In Terakado, a structure is disclosed where a metallic mesh shadow mask 11 covers over an object silicon substrate. However, Terakado's mask 11 is only for collimating the light 10, as shown in Fig. 2 (Terakado, column 4, lines 12—19).

Terakado is silent about a function of the mask 11 that inhibits a part of gas and plasma from passing through the mask, like a plate of the present invention.

In addition, in Terakado's structure, only a region irradiated by light is selectively etched at a predetermined depth as shown in Fig 2.

Terakado fails to teach or suggest a production of fine texture on a surface of the substrate to be etched, as taught by the present invention.

Furthermore, the Office states that Terakado teaches using a mask having 40% open area. However, Terakado at column 6, lines 62—63 states that the mask is a stainless stencil having line width: space width – 50 μm:100 μm, thus the open area ratio is 100/150=66%, which is different from the range 5—40% of claims 24, 35 of the present invention.

In light of the foregoing, Applicant respectfully submits that Terakado could not have anticipated or rendered obvious claims 13, 14, 18, 19, 23-27, 30, 32-37, and 39., because Terakado fails to teach or suggest each and every claim limitation. Withdrawal of this rejection is thus respectfully requested.

Claims 13-15, 18, 19, 23, 25, 26, 30, 32-34, and 36-39 stand rejected under 35 U.S C. 102(b) as being anticipated by Cuomo et al. (U.S. Patent No. 4,523,971). This rejection is moot with respect to claim 38 due to the cancellation of this claim. The Applicant respectfully traverses this rejection as to claims 13-15, 18, 19, 23, 25, 26, 30, 32-34, and 36, 37, and 39.

Cuomo teaches an ion beam etching method using grids 34, 35 as shown in Fig. 1. The grids 34, 35 are, as stated at column 4, lines 28—31 of Cuomo, extract ions from the ion plasma, and accelerate the ions by applying voltage. Grids 34, 35 are not the plate that inhibits a part of gas and plasma from passing therethrough as in claim 13.

Furthermore, Cuomo discloses an ion beam etching method for bombarding accelerated ion beams onto a substrate. Cuomo fails to teach or suggest an etching by a reactive ion etching method as is recited in amended claim 13.

The Office states, Cuomo teaches that a distance is 5 mm between grid 72 and film 76 in Fig. 4 (Cuomo, column 7, lines 1—2). However, the apparatus of Fig.4 is a measuring apparatus for demonstrating resolution of etching by grid without need for multiple masks (Cuomo, column 7, lines 9—20). The distance 5 mm is a distance needed for accelerating an ion between the grid and the substrate up to 200 election volts (Cuomo, column 6, line 66). In contrast, the distance between the plate and the substrate of the present invention is selected so as to trap silicon compounds between the plate and the substrate (Applicant's specification, at p. 19, line 23-p.20, line 3). Therefore, the distance of between the plate and the substrate in the present invention is inherently different from the distance of Cuomo. As a

result, the example of Cuomo does not teach or suggest claims 15, 37 of the present invention.

In light of the foregoing, Applicant respectfully submits that Cuomo could not have anticipated or rendered obvious claims 13-15, 18, 19, 23, 25, 26, 30, 32-34, and 36, 37, and 39, because Cuomo fails to teach or suggest each and every claim limitation. Withdrawal of this rejection is thus respectfully requested.

Claims 13-15, 18, 19, 23, 25, 26, 30-34, and 36-40 stand rejected under 35 U.S C. 102(b) as being anticipated by Ikeda et al. (U.S. Patent No. 4,243,506). This rejection is moot with respect to claim 38 due to the cancellation of this claim. The Applicant respectfully traverses this rejection as to claims 13-15, 18, 19, 23, 25, 26, 30, 32-34, and 36, 37, and 39.

Ikeda teaches a structure wherein a mesh electrode 22 is covered over the substrate 3 as shown in Fig. 3. This structure is in contrast to that of amended claim 13 wherein a substrate to be etched is provided on an RF electrode provided inside a chamber, directly or through a tray. Therefore, Ikeda fails to teach or suggest the present invention.

Furthermore, Ikeda is silent on the structure of claim 13 that covers the substrate placed on an RF electrode with a plate.

In light of the foregoing, Applicant respectfully submits that Ikeda could not have anticipated or rendered obvious claims 13-15, 18, 19, 23, 25, 26, 30, 32-34, and 36, 37, and 39. Withdrawal of these rejections is thus respectfully requested.

CLAIM REJECTIONS UNDER 35 U.S.C. § 103:

Claims 28 and 29 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over one of Terakado, Cuomo or Ikeda in view of Chung (U.S. Patent No. 6,316,289). The Applicant respectfully traverses this rejection,.

Claims 28 and 29 depend from claim 13, and as such include all the limitations of claim 13, and therefore, cannot be rendered obvious over Terakado, Cuomo or Ikeda for at least the same reasons discussed above. Chung cannot remedy the defect of Terakado, Cuomo or Ikeda and is not relied upon by the Office for such. Instead, the Office cites Chung for teaching forming a standoff mask by laminating a plurality of spaced long members. With respect to claims 28 and 29, the Office states "Chung teaches forming a stand off mask by laminating a plurality of spaced apart long members". Column 4, lines 34—38 of Chung states "metal sheet 102 may be ... laminates of sheets thereof". The claimed structure of claim 28 is, as shown in Fig. 7 and Fig. 8C of the application, stacks a plurality of plates. In claims 28 and 29, the terms "laminated" and "laminating" were changed to --stacked-- and --stacking--, respectively, in order to further clarify the differences between Chung and the present invention. Withdrawal of this rejection is thus respectfully requested.

Applicant believes the foregoing amendments comply with requirements of form and thus may be admitted under 37 C.F.R. § 1.116(b). Alternatively, if these amendments are deemed to touch the merits, admission is requested under 37 C.F.R. § 1.116(c). In this connection, these amendments were not earlier presented because they are in response to the matters pointed out for the first time in the Final Office Action.

Lastly, admission is requested under 37 C.F.R. § 1.116(b) as presenting rejected claims in better form for consideration on appeal.

In view of the foregoing, it is respectfully submitted that the application is in condition for allowance. Reexamination and reconsideration of the application, as amended, are requested.

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at the Los Angeles, California telephone number (213) 337-6700 to discuss the steps necessary for placing the application in condition for allowance.

If there are any fees due in connection with the filing of this response, please charge the fees to our Deposit Account No. 50-1314.

Respectfully submitted,
HOGAN & HARTSON L.L.P.

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